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FERTILIZER PRODUCTION IN THE GDR

/According to the original, the following article is based upon absolutely reliable sources and gives for the first time a total summary of the fertilizer problem in the Soviet Zone. The figures refer to fiscal years of the fertilizer industry, which run from 1 June through 31 May of the following year. In order to permit a summary for the calendar year 1950, the results for June 1950 and the second half of 1950 are also given./

Nitrogen Fertilizer Industry

An important factor in the fertilizer economy of the Soviet Zone is the fact that a substantial part of the total fertilizer production is in the hands of Soviet Corporations (SAG).

The only factory in East Germany which produces synthetic ammonia for further conversion to fertilizer or industrial nitrogen products is the Leuna plant, which formerly belonged to the I. G. Farbenindustrie and is now a Soviet corporation. As such it has received preferential treatment in the allocation of machines, workers, electric power, etc., and thus was able to begin reconstruction sooner than German-owned plants. Although the plant had suffered severe war damage, and a part of it had been dismantled, production of ammonia increased from 50,600 tons of nitrogen in 1945/1946 to 227,400 tons in 1949/1950, which was probably the maximum production possible at that time.

Part of the primary ammonia produced at Leuna is converted into nitrogen fertilizer and industrial nitrogen products at the plant; part is processed by the SAG factories Farbenfabrik Wolfen (Wolfen Dye Factory) and Elektrochemisches Kombinat Bitterfeld (Bitterfeld Electrochemical Combine), both of which are also former I. G. Farben plants. A small amount is used as ammonia in unconverted form for industrial purposes. Since May 1948, a factory belonging to the Gluckauf potash works in Sondershausen has also been converting primary ammonia from Leuna into "potassium-ammonium nitrate" (a mixture of potassium chloride and ammonium nitrate, containing 15 percent N, 30 percent K_2O, and 5 percent CaO).

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The former Bavarian Nitrogen Works in Piesteritz, also a SAG factory, produces calcium cyanamide. This plant was also partly dismantled. Nevertheless, since 1945/46 a steady upward development of production can be observed. As at Leuna, the peak of production has probably been reached at Piesteritz also.

Insignificant amounts of nitrogen are obtained as by-products at the Karl Marx and August Bebel coking plants in Zwickau. These two plants formerly belonged to the Erzgebirge Black Coal Corporation and are now people-owned factories. No exact figures are available on production of industrial nitrogen products. In the past year it probably was in the neighborhood of 10,000 tons of N. Total figures for production of nitrogenous fertilizer broken down by method of production and by plant, are given in the following table:

Total Nitrogenous Fertilizer Production (in tons) of N

	1 Jun 47-31 May 48	1 Jul 48-31 May 49	1 Jun 49-31 May 50	Jun 50	1 Jul-31 Dec 50 (Est)
Ammonia synthesis, Leuna	149,200	187,900	227,400	20,000	123,000
Calcium cyanamide, Piesteritz	14,600	15,700	19,800	1,800	11 000
Calcium cyanamide, Hirschfelde	--	--	100	--	--
By-products containing nitrogen	300	300	700	--	300
Total	164,100	203,900	248,000	21,800	134,300

Specifically, the following nitrogen fertilizers are produced:

a. Ammonium sulfate: at Leuna; also as by-product in the Karl Marx and August Bebel coking plants and, since 1950, in the new factory in Dessau-Rosslau.

b. Calcium ammonium nitrate: in Wolfen and Bitterfeld.

c. Potassium ammonium nitrate: in Sondershausen.

d. Soda saltpeter: in Wolfen, Sondershausen, and the Schwarzheide fuel plant near Ruhland, formerly Brabag (Brown Coal Gasoline Corporation), now an SAG.

e. Calcium Cyanamide: at Piesteritz and, since 1950, in the people-owned factory Elektrochemie (electrochemistry), Hirschfelde. Nitrophoska, a nitrogen-phosphate compound, was produced at Piesteritz only until 1945/1946, since the installation was dismantled in spring 1946.

Of the total nitrogen fertilizer produced in 1949/50, 121,700 tons of N, or 57 percent, were ammonium sulfate, 72,100 tons of N, or 34 percent, were ammonium nitrate and other nitrates, and 19,900 tons of N, or 9 percent, were calcium cyanamide. From the standpoint of effective fertilizing, the proportion of ammonium sulfate is much too high, and that of ammonium nitrate and other nitrates is substantially too low. A shift in favor of ammonium nitrate and other nitrates, which are in demand by agriculture, is not possible with the present processing capacities, since these were fully utilized in 1949/50.

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This emphasizes the detriment caused by dismantling the Leuna installations for processing nitrogenous fertilizers (calcium ammonium nitrate, mixed ammonium sulfate and nitrate, and calcium nitrate). In the last year before the war, 1938/1939, ammonium sulfate represented only 23 percent of the total production, whereas ammonium nitrate and other nitrates represented 57 percent.

The table on the following page shows details on the production of nitrogenous fertilizers:

PRODUCTION OF NITROGENOUS FERTILIZERS
(in tons of N)

Plant		Product	45/46	46/47	1 Jun 47/ 31 May 48	1 Jun 48/ 31 Ma 49	1 Jun 49/ 31 May 50	Jun 50	Jul-Dec 50 (Est)
Leuna		Ammonium sulfate	21,600	46,800	76,300	97,000	121,000 (a)	10,600 (a)	66,000 (a)
Karl Marx		Ammonium sulfate	200	300	200	200	300	--	150
August Bebel		Ammonium sulfate	--	--	100	100	300	--	150
Dessau-Rosslau		Ammonium sulfate	--	--	--	--	100	--	--
	Total	Ammonium sulfate	21,800	47,100	76,600	97,300	121,700	10,600	66,300
Wolfen		Calcium ammonium nitrate	15,100	9,600	20,000	22,900	25,900 (b)	2,200 (b)	14,200 (b)
Bitterfeld		Calcium ammonium nitrate	100	10,100	22,100	28,400	32,000	2,500	15,000
	Total	Calcium ammonium nitrate	15,200	19,700	42,100	51,300	57,900	4,700	29,200
Wolfen		Sodium nitrate	100	1,200	1,700	4,300	5,300	400	2,500
Sonde hausen		Sodium nitrate	--	--	--	--	100	--	400
Schwarzheide		Sodium nitrate	--	--	--	--	100	--	--
	Total	Sodium nitrate	100	1,200	1,700	4,300	5,500	400	2,900

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Sondershausen	Mixture of potassium chloride and ammonium nitrate	--	--	--	5,500	8,700	700	4,600
Piesteritz	Calcium cyanamide	3,800	6,600	14,600	15,700	19,800	1,800	11,000
Hirschfelde	Calcium cyanamid	--	--	--	--	100	--	--
Total	Calcium cyanamide	3,800	6,600	14,600	15,700	19,900	1,800	11,000
Piesteritz	Nitrophoska	3,000	--	--	--	--	--	--
Total		43,900	74,600	135,000	174,100	213,700	18,200	114,000

(a) Of this, exported: June 1949 - June 1950 = 28,200 tons of N
July - December 1950 = 18,000 tons of N

(b) Of this, exported: June 1949 - June 1950 = 3,600 tons of N
July - December 1950 = 2,000 tons of N

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Phosphorus Fertilizer Industry

In the Soviet Zone there are five superphosphate plants: Coswig, Salzwedel, Magdeburg Suedost, Oschersleben, and Draschwitz/Reuden. Their capacity totals 35,600 tons of P_2O_5, but in no fiscal year were the plants able to utilize it to the fullest extent; in the best year, 1948/49, only 53 percent of capacity was utilized, because there frequently was a lack of sulfuric acid; also, not enough rock phosphate could be delivered. For this reason, production had to be reduced at times or temporarily discontinued. Until 1947/48 approximately 60 percent of the imported rock phosphate came from French North Africa, and the remaining 40 percent from the USSR. From 1948/49 on, for all practical purposes, only Soviet rock phosphate (Kola apatite) has been processed. The import of rock phosphate was: 1946/47, 15,000 tons; 1947/48, 40,000 tons; 1948/49, 58,000 tons; and 1949/50, 60,000 tons. Three tons of rock phosphate yield about one ton of superphosphate.

In Unterwellenborn, Thomas phosphate is being produced. The capacity of this plant, 5,000 tons of P_2O_5 (by using rock phosphate to supply phosphorus in the Moeller blast furnace), was not nearly utilized up to 1948/49, since no rock phosphate was available. Because of the low phosphorus content of the iron ore received for smelting, and because of the lack of rock phosphate, the greater part of the Thomas slag had to be recharged into the blast furnace as a source of phosphorus, so that up to 1948/49, the production of Thomas phosphate was very low. No appreciable increase in production took place until 1949/50, when sufficient amounts of rock phosphates could be made available; in that year, 4,200 tons of P_2O_5 (84 percent of capacity) were produced.

To increase production of phosphorus fertilizers, the Two-Year Plan, 1949-1950, included the building of three calcined phosphate (Gluehphosphat) plants, which are not dependent upon sulfuric acid for their production. The first plant of this type was put into operation in Heinrichshall in April 1949. The product manufactured there was first marketed as calcined phosphate, later as potassium phosphate.

Heinrichshall had great difficulties in getting started. In addition, the potassium phosphate found little favor with the farmers. Instead of the 6,000 tons of P_2O_5 planned for 1949/50, only 1,200 tons of P_2O_5 could be produced. Another calcined phosphate plant with a capacity of 16,000 tons of P_2O_5 is planned in Ruedersdorf, near Berlin. Production should have begun by now. The location of the third plant to be set up has not yet been settled.

Increased import of superphosphates was necessary to overcome to some degree the deficiency in phosphoric acid. Therefore, trade agreements were entered into with the Netherlands, Belgium, and even the US, whereby these countries furnished the urgently needed phosphoric acid fertilizer in exchange for potash fertilizer. The main supplier was the Netherlands; Belgium was second in importance; the US furnished only insignificant quantities, and only in 1948-49.

In 1949/50 the Soviet Zone also received superphosphate from West Germany under the interzonal trade agreement (13,000 tons of P_2O_5). The total import of superphosphate in 1949/50 amounted to about 68,100 tons of P_2O_5, whereas in 1946/1947 only 2,300 tons of P_2O_5 were imported.

Altogether, in 1949/50, the phosphoric acid fertilizer made available to Soviet Zone agriculture through domestic production and import amounted to 91,000 tons of P_2O_5, or 50 percent of the requirements just before the war. Thus, there is still a long way to go to reach the phosphoric-acid consumption of 1938/39.

The following table gives details on production and import of phosphorus fertilizers:

Production and Import of Phosphorus Fertilizers (in Tons of P_2O_5)

Product and Plant	1 Jun 47-31 May 48	1 Jun 48-31 May 49	1 Jun 49-31 May 50	Jul-Dec 50 (Est)
Superphosphate				
Coswig	4,100	6,200	6,200	4,500
Salzwedel	3,400	3,400	3,900	3,000
Magdeburg Suedost	3,000	4,700	3,700	2,800
Oschersleben (a)	800	2,300	1,800	1,300
Draschwitz-Reuden	1,900	2,300	1,900	1,400
Superphosphate, total	13,200	18,900	17,500	13,000
Potassium phosphate				
Heinrichshall (b)	--	--	1,200	1,300
Thomas phosphate				
Unterwellenborn (c)	800	800	4,200	2,500
Total production	14,000	19,700	22,900	16,800
Import of superphosphate	18,100	42,800	68,100	30,000
Total, production plus import	32,100	62,500	91,000	46,800

(a) Plant put into operation, November 1947
(b) Plant put into operation, April 1949
(c) Assuming a sufficient supply of rock phosphate as source of phosphorus for Moeller blast furnace

Potassium Fertilizer Industry

The potash plants in the Soviet Zone fall into two groups:

1. People-owned plants, with eight installations: Aschersleben, Klein-Schierstedt, Kruegershall, Rossleben, Solvayhall, Stassfurt, Beendorf, and Glueckauf-Sondershausen.

2. SAG plants, with seven installations: Bleicherode, Sachsen-Weimar, Sollstedt, Bismarckhall, Volkenroda, Kaiseroda, and Heiligenroda.

The SAG plants are all in Thueringen and are larger and more productive installations, since they manufacture potassium end products almost exclusively, while in the people-owned plants, seven of which are in Sachsen-Anhalt, about 25 percent of the total production must be sold in the form of crude potassium salts (kainite and sylvinite).

No reliable figures are available, especially for the last 2 years, on the production of potassium compounds. In 1945/46, production of potash fertilizer was only 294,000 tons of K_2O, because there were still on hand in the plants considerable supplies which had to be disposed of first, and export had not yet started. By 1947/48 production had increased to 760,000 tons of K_2O; later there was a further increase, so that in 1948/49 and 1949/50, production may have been about 950,000 and 1,100,000 tons of K_2O, respectively. The total capacity of all the plants is perhaps 1,300,000 tons of K_2O. The greater part of the potassium compounds produced is exported. In 1946/47, export amounted to about 400,000 tons of K_2O; it increased substantially in the following years and reached about 700,000 tons K_2O in 1949/50.

The quantity of potash fertilizer available for domestic consumption was greatest in 1945/46, with 419,000 tons of K_2O; later, the amount fluctuated between 242,000 and 322,000 tons of K_2O. In the last prewar year, 1938/39, approximately 325,000 tons of K_2O were sold in the area now comprising the Soviet Zone.

The following table summarizes production, domestic consumption, and export of potash fertilizers from 1945/46 to 1949/50 and July - December 1950.

	1 Jun 47-31 May 48	1 Jun 48-31 May 49	1 Jun 49-31 May 50	Jun 1950	Jul-Dec 50 (Est)
People-owned plants	220.4	275	300	25	150
SAG plants	539.6	675	800	75	450
Total	760	950	1,100	100	600
Export	518.1	689.2	778.1	70.5	400

Calcium Fertilizer Industry

There are 50 lime plants in the Soviet Zone which produce calcium fertilizers. They are divided as follows among the Laender: Sachsen-Anhalt, 20 plants; Sachsen, 17 plants; Thueringen, 12 plants; and Brandenburg, one plant. The production of these plants has taken a considerable upward turn since 1945/46. In 1945/46, the total production of calcium fertilizer was 40,000 tons of CaO, whereas in 1949/50 approximately 580,000 tons of CaO were produced. The lime plants in Sachsen-Anhalt produce much more than half of the total output.

In 1945/46 - 1947/48, on the average, one third of the total production of lime fertilizers was calcium carbonate (lime marl), the use of which is limited because of varying soil conditions, and two thirds was quicklime, slaked lime, and mixed lime. This ratio changed considerably in 1948/49, when the percentage of calcium carbonate was 45 percent, that of the other calcium compounds 55 percent. In 1949/50 the proportion of calcium carbonate again dropped to one-third.

In 1949/50, in addition to the calcium fertilizers produced by the lime plants, agriculture in the Soviet Zone had at its disposal an estimated 80,000 tons of CaO in the form of sugar-factory waste. This material contains about 10 percent CaO when moist, as it leaves the factory, and about 15-20 percent after drying; it is given away free by the sugar factories to farmers in the vicinity, and has never been subject to rationing.

In Mecklenburg and Brandenburg, fresh-water limestone, which contains about 20 percent CaO, is also used for fertilizing. It helps to equalize the supply in these Laender in comparison with the lime-producing Laender Sachsen-Anhalt, Thueringen, and Sachsen.

Providing Agriculture With Fertilizers

At the end of the war the distribution of fertilizer in the Soviet Zone was at first still in the hands of former sales organizations, such as the Nitrogen Syndicate, the Potash Syndicate, and the Greater German Phosphate Union. Since the syndicates had to be dissolved in accordance with a resolution of the Control Council this function was transferred on 1 June 1946 to the newly formed German Central Office for Fertilizers. This office took over the distribution or sale of all fertilizers, including calcium fertilizers, whether they were produced in the Zone or imported.

From 1946/47 to 1949/50 all fertilizers were rationed, so as to assure distribution according to plan. Since 1950/51, only nitrogen and phosphoric acid fertilizers have been subject to control, while potash and lime fertilizers may be procured without restriction.

The sale of nitrogen and potash fertilizers again approaches prewar conditions. Although the sale of phosphoric acid fertilizer in 1949/50 increased by 30,900 tons of P_2O_5, or 49 percent, over the figure for 1948/49, it is still only 94,000 tons of P_2O_5, far below the volume in 1938/39. Phosphoric acid has been and still is the bottleneck in the Soviet Zone fertilizer supply. For the time being, the lack can be made up only through increased import, since the capacity of the existing plants and those under consideration is not enough for self-sufficiency.

Although the sale of lime fertilizer in 1949/50 exceeded that of 1938/39 by 60,000 tons of CaO, the lime consumption of agriculture in the Soviet Zone has not yet regained the prewar level. If one adds to the commercial lime fertilizer sold in 1949/50 the lime put into the soil in the form of lime-containing nitrogenous fertilizers, Thomas phosphate, and sugar-factory waste, one arrives at a total of only 780,000 tons of CaO, as compared with about one million tons of CaO in 1938/39.

Fertilizer Sales in East Germany
(in 1,000 tons of pure fertilizing agent)

	38/39	47/48	48/49	49/50	Jul-Dec 50 (Est)
Nitrogen fertilizer	218.3	129.4	177.5	183.4	81
Phosphoric acid fertilizer	182.6	27	63.1	94	34
Kainite (a)	--	65.5	77.5	70.4	22
Refined potassium products	--	176.4	183.3	251.4	172
Potassium fertilizers, total	323.4	241.9	260.8	321.8	194
Calcium fertilizers	520	267 8	424 5	579.7	270

(a) Includes sylvinite

The ratio of the three basic fertilizing agents (N, P, K), taking nitrogen as 1, shows the following development in the Soviet Zone, compared with the generally accepted optimum ratio:

	Optimum Ratio	38/39	47/48	48/49	49/50
Nitrogen	1.00	1.00	1.00	1.00	1.00
Phosphoric acid	1.00	0.84	0.21	0.35	0.51
Potash	1.75	1.49	1.86	1.47	1.75

In 1945/46 and 1946/47, the ratio was very much out of balance because of the shortage of P_2O_5 and the excess of K_2O. Although the proportion of phosphoric acid is still far below the desirable goal, nitrogen and potash were in balance in 1949/50.

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